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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,962	08/16/2001	Yoshio Fukuhara	70840-56398	5416
21874	7590	10/05/2005	EXAMINER	
EDWARDS & ANGELL, LLP			WONG, ALLEN C	
P.O. BOX 55874			ART UNIT	
BOSTON, MA, 02205			PAPER NUMBER	
			2613	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/931,962	Applicant(s) FUKUHARA ET AL.	
	Examiner Allen Wong	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/9/05 has been entered.

Response to Arguments

2. Applicant's arguments filed 9/9/05 have been fully read and considered but they are not persuasive.

Regarding page 5 of applicant's remarks, applicant states that Korein does not specifically disclose a single stationary camera which does not rotate. It is true that Korein's stationary camera does not rotate. Then, the applicant asserts there is no motivation to combine Korein and Geng. The examiner respectfully disagrees. Since Korein does not specifically disclose the single stationary which does not rotate. However, Geng teaches the use of a OMNI-Mirror or an omni-directional mirror where the stationary CCD camera placed underneath the non-moving, stationary OMNI-Mirror that reflects all of incoming viewing rays towards the stationary, non-rotating CCD camera so that all these reflected viewing rays can be imaged to the display so as to see the omni-directional view of the entire scene, where the camera can effectively see the objects from a single viewpoint O. Clearly, Geng teaches the use of a single

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stationary camera that does not rotate since it is clear that the camera needs to be focused at point O of the OMNI-mirror to clearly obtain all of the incoming reflected viewing rays of the entire scene. Further, applicant's figure 7 is setup in a similar manner as Geng's figure 4. Applicant's camera 73 is sitting below the hyperbolic mirror 70, and Geng's figure 4 shows the camera is sitting below the OMNI-Mirror. So, there is similarity in both Geng and the applicant's invention. Thus, the combination of Korein and Geng is considered combinable and reasonable since both teachings are used in analogous image capturing and processing environments.

The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one of ordinary skill in the art to combine the teachings of Korein and Geng, as a whole, for capturing omnidirectional three dimensional images to accomplish practical tasks, ie. object detection and tracking, that require simultaneous 360 degree viewing angle and three dimensional measurement capabilities, as disclosed in Geng's column 3, lines 1-4.

Thus, the rejection of claims 1-8 is maintained.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korein (6,226,035) in view of Geng (6,304,285).

Regarding claim 1, Korein discloses a moving object tracking apparatus for detecting and tracking one or more moving objects in an environment, comprising:

an optical system including a hyperboloidal mirror for capturing visual field information (col.9, ln.29-34; fig.1, note optical system 10 can replace the mirror 12 with a hyperbolic or hyperboloidal mirror for capturing visual field of the wide angle image data);

a single stationary camera for converting the captured visual field information to image information (fig.1, element 20); and

an information processing section for processing the image information (fig.1, element 106 is the computer that processes the captured image information, col.11, ln.48 to col.12, ln.6),

wherein the information processing section detects and tracks the one or more moving objects based on the image information (col.12, ln.37-41 discloses that objects can be tracked, thus the object is detected; and col.13, ln.48-57, Korein discloses that

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motion detectors can be applied to the captured image information for tracking purpose).

Korein does suggest that omni-directional imaging system can be constructed using a camera, a parabolic mirror and a telecentric lens (col.9, ln.50-51), and also, that a hyperbolic mirror is used in Korein's wide-angle optical system (col.9, ln.29-34). Although Korein does not specifically disclose hyperboloidal mirror for capturing visual field information on a 360 degrees environment, however, Geng discloses that a hyperbolic mirror can be used for capturing the visual field information omni-directional image data on a 360 degrees environment (see fig.4 and col.4, ln.29-37; note the omni-mirror can be a hyperbolic mirror to capture the omni-directional or all direction view or 360 degrees environment view of the scene, and that, the hyperbolic mirror is below the CCD camera to optimally capture images of a 360 degrees environment or panoramic scene). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Korein and Geng, as a whole, for capturing omnidirectional three dimensional images to accomplish practical tasks, ie. object detection and tracking, that require simultaneous 360 degree viewing angle and three dimensional measurement capabilities (Geng col.3, ln.1-4).

Korein discloses a single stationary camera that rotates (fig.1, element 20). Korein does not specifically disclose the single stationary camera that does not rotate. However, Geng teaches the use of a single stationary camera that does not rotate (col.4, ln.4-50, Geng discloses the use of a OMNI-Mirror or an omni-directional mirror where the stationary CCD camera placed underneath the non-moving, stationary

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OMNI-Mirror that reflects all of incoming viewing rays towards the stationary, non-rotating CCD camera so that all these reflected viewing rays can be imaged to the display so as to see the omni-directional view of the entire scene, where the camera can effectively see the objects from a single viewpoint O). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Korein and Geng, as a whole, for capturing omnidirectional three dimensional images to accomplish practical tasks, ie. object detection and tracking, that require simultaneous 360 degree viewing angle and three dimensional measurement capabilities (Geng col.3, ln.1-4).

Regarding claim 2, Korein discloses wherein: the image information includes all-direction image information (col.9, ln.50-56); and the information processing section converts at least a portion of the all-direction image information to panoramic image information (col.2, ln.6-11 and col.9, ln.50-56).

Regarding claim 3, Korein discloses wherein the information processing section provides a marker to each of the one or more moving objects in the panoramic image information (col.12, ln.65 to col.13, ln.6 and col.13, ln.39-45).

Regarding claim 4, Korein discloses wherein the information processing section provides a marker to each of the one or more moving objects depending on a size of each of the one or more moving objects (col.12, ln.65 to col.13, ln.6 and col.13, ln.39-45).

Regarding claim 5, Korein discloses wherein: the image information includes all-direction image information (col.9, ln.50-56); and the information processing section

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converts at least a portion of the all-direction image information to perspective projection image information (col.2, ln.6-11 and col.9, ln.50-56, note panoramic image data produced is the perspective image information).

Regarding claim 6, Korein wherein the information processing section processes the image information using a previously prepared table (col.13, ln.58 to col.14, ln.63; note Korein discloses that the image information can be obtained by using stored data in the tables, ie. the mathematical formulas for conversion processes of image data from spherical coordinates to Cartesian coordinates, so that one can facilitate image reproduction).

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korein (6,226,035), Geng (6,304,285) and in view of Matsuda (5,953,449).

Regarding claim 7, Korein and Geng do not specifically wherein the information processing section processes the image information using only one kind of data out of RGB data in the image information. However, Matsuda teaches the use of the RGB data from the image information to utilize and calculate color values during image processing (col.9, ln.20-22). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Korein, Geng and Matsuda, as a whole, for easily measuring color information of the RGB data in an accurate manner so as to enhance displaying image data (col.3, ln.59-64).

4. Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korein (6,226,035), Geng (6,304,285) and in view of Lee (5,787,199).

Regarding claim 8, Korein discloses a motion detector to detect the motion of a target (col.13, ln.48-57). Korein and Geng do not specifically disclose wherein the information processing section detects the one or more moving objects based on a brightness difference between predetermined frame information and frame information previous to the predetermined frame information of the image information. However, Lee teaches wherein the information processing section detects the one or more moving objects based on a brightness difference between predetermined frame information and frame information previous to the predetermined frame information of the image information (col.2, ln.62 to col.3, ln.7). Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Korein, Geng and Lee, as a whole, for determining whether the object belongs in the foreground or background region, and for clearly distinguishing the objects within a picture (Lee col.1, ln.54-56). Doing so would improve the encoding of the image information while maintain high image quality and accuracy.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (571) 272-7341. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Allen Wong', with a long, sweeping horizontal stroke extending to the right.

Allen Wong
Primary Examiner
Art Unit 2613

AW
10/3/05